

## Assignment Day 5 | 4th December 2020

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For any doubts regarding the assignment, ask questions in the [Linux Administration 101 B1](#) Group in the Community.

Submit Assignments by **12th December 2020 11:59 PM.**

Assignment Submit Form : <https://forms.gle/9MNzWbdDXhhdstWEA>

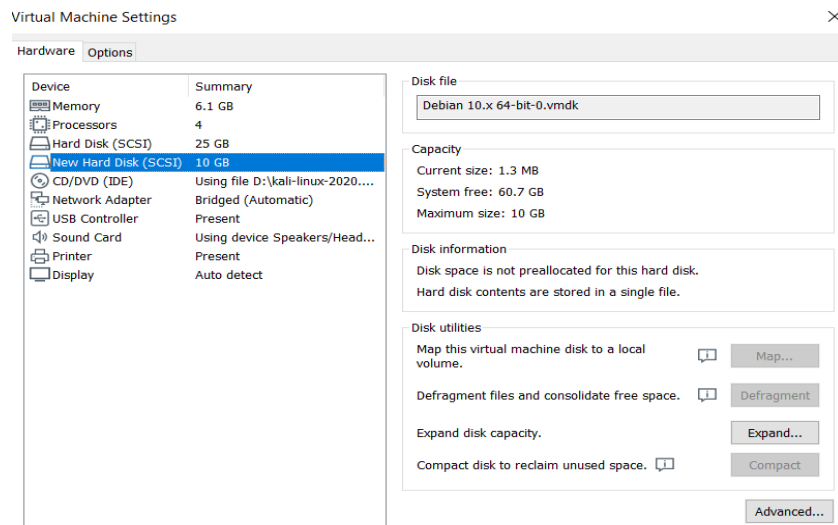
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### Question 1

1. Add a 10GB disk to the CentOS.
2. Create 2 Partitions 4GB and 6GB of Space respectively.
3. Format 4GB with xfs and 6GB with ext4 file system.
4. Mount 4GB and 6GB in /data and /music directory respectively.
5. Create one file of 1GB in each of the mount point created above.
6. Verify the disk Consumption and disk space free in the mounted partitions.

## 1. Adding Extra 10 GB disk to the Linux Machine (Kali Linux)



- Go to virtual machine settings of particular machine
- Add hard disk and specify size of disk to extend.

## 2. Verify the disk whether it is added to the machine or not.

```
sunam@kali:~$ sudo fdisk -l
[sudo] password for sunam:
Disk /dev/sda: 25 GiB, 26843545600 bytes, 52428800 sectors
rs
Disk model: VMware Virtual S
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x05a89833

Device     Boot    Start      End  Sectors  Size Id Type
/dev/sda1  *        2048 44040191 44038144 21G 83 Linux
/dev/sda2              44042238 52426751 8384514  4G  5 Exten
/dev/sda5              44042240 52426751 8384512  4G 82 Linux

Disk /dev/sdb: 10 GiB, 10737418240 bytes, 20971520 sectors
rs
Disk model: VMware Virtual S
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
sunam@kali:~$
```

- Open the terminal on the machine.
- Execute `fdisk -l` command which list the disks assigned to the machine. And it also list the partitioning of the disks if it was done previously.

### 3. Creating partitions on newly added disk i.e. 10 GB

```
sunam@kali:~$ sudo fdisk /dev/sdb

Welcome to fdisk (util-linux 2.34).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table.
Created a new DOS disklabel with disk identifier 0xaddabae6.

Command (m for help): n
Partition type
  p   primary (0 primary, 0 extended, 4 free)
  e   extended (container for logical partitions)
Select (default p): p
Partition number (1-4, default 1): 1
First sector (2048-20971519, default 2048): 2048
Last sector, +/-sectors or +/-size[K,M,G,T,P] (2048-20971519, default 20971519): +4G

Created a new partition 1 of type 'Linux' and of size 4 GiB.

Command (m for help): n
Partition type
  p   primary (1 primary, 0 extended, 3 free)
  e   extended (container for logical partitions)
Select (default p): p
Partition number (2-4, default 2): 2
First sector (8390656-20971519, default 8390656):
Last sector, +/-sectors or +/-size[K,M,G,T,P] (8390656-20971519, default 20971519): +6G
Value out of range.
Last sector, +/-sectors or +/-size[K,M,G,T,P] (8390656-20971519, default 20971519): +5.5G

Created a new partition 2 of type 'Linux' and of size 5.5 GiB.

Command (m for help): w
The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.

sunam@kali:~$
```

- i. Execute fdisk [disk name] command to do the partitioning.
- ii. It will ask for the type of partition, partition number and first sector and last sector.
- iii. Here we created two partitions of 4 GB and 5.5 GB.

Note: we are requested to do partitions of 4GB and 6GB but we got one error “value out of range” message so, we decreased that partition size to 5.5 GB.

4. Verify whether the partitions were created properly or not.

```
sunam@kali:~$ sudo fdisk -l
Disk /dev/sda: 25 GiB, 26843545600 bytes, 52428800 sectors
Disk model: VMware Virtual S
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x05a89833

Device      Boot    Start        End    Sectors    Size Id Type
/dev/sda1   *          2048    44040191  44038144    21G 83 Linux
/dev/sda2             44042238  52426751  8384514     4G  5 Extended
/dev/sda5             44042240  52426751  8384512     4G 82 Linux swap / Solaris

Disk /dev/sdb: 10 GiB, 10737418240 bytes, 20971520 sectors
Disk model: VMware Virtual S
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0xaddabae6

Device      Boot    Start        End    Sectors    Size Id Type
/dev/sdb1             2048    8390655  8388608     4G 83 Linux
/dev/sdb2          8390656  19924991  11534336    5.5G 83 Linux
sunam@kali:~$
```

- i. Execute fdisk -l command again to confirm the partitions on newly added disk.

5. Format 4GB partition with xfs file system and another partition with ext4 file system.

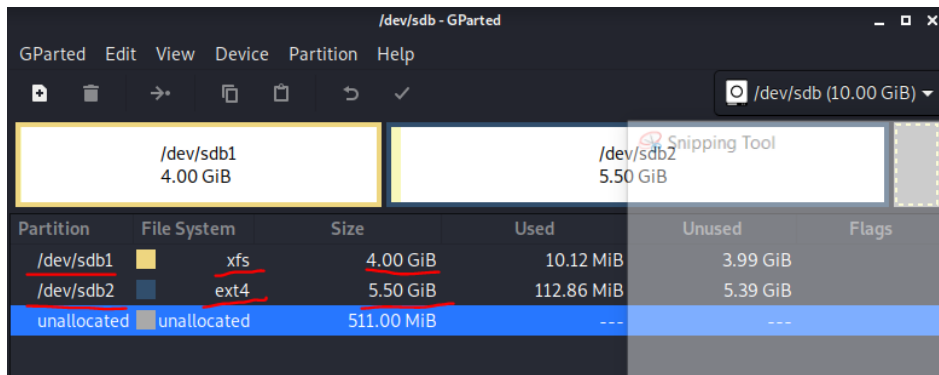
```
sunam@kali:~$ sudo mkfs.xfs /dev/sdb1
meta-data=/dev/sdb1            isize=512    agcount=4, agsize=262144 blks
=                               sectsz=512   attr=2, projid32bit=1
=                               crc=1       finobt=1, sparse=1, rmapbt=0
=                               reflink=1
data            =               bsize=4096   blocks=1048576, imaxpct=25
=                               sunit=0       swidth=0 blks
naming          =version 2     bsize=4096   ascii-ci=0, ftype=1
log             =internal log  bsize=4096   blocks=2560, version=2
=                               sectsz=512   sunit=0 blks, lazy-count=1
realtime        =none          extsz=4096   blocks=0, rtextents=0
sunam@kali:~$ sudo mkfs.ext4 /dev/sdb2
mke2fs 1.45.5 (07-Jan-2020)
Creating filesystem with 1441792 4k blocks and 360448 inodes
Filesystem UUID: a5ce510f-200f-4a3e-8c51-010b8fd9552e
Superblock backups stored on blocks:
    32768, 98304, 163840, 229376, 294912, 819200, 884736

Allocating group tables: done
Writing inode tables: done
Creating journal (16384 blocks): done
Writing superblocks and filesystem accounting information: done

sunam@kali:~$
```

- i. Execute mkfs.xfs [partition name] to format that particular partition with xfs file system.
  - ii. Execute mkfs.ext4 [partition name] to format that particular partition with ext4 file system.

6. Verify the file system and size of the partition through GParted (i.e. Graphical view)



- i. Open GParted tool on linux machine
- ii. Select the disk and see the details of the partition.

7. Create directories to mount the partitions

```
sunam@kali:~$ sudo mkdir /data
sunam@kali:~$ sudo mkdir /music
sunam@kali:~$ cd /
sunam@kali:/$ ls
bin      home      libx32    proc      tmp
boot     initrd.img  lost+found  root      usr
data     initrd.img.old  media      run       var
Desktop  lib        mnt       sbin      vmlinuz
dev      lib32      music      srv       vmlinuz.old
etc      lib64      opt       sys
```

- i. Create /data directory to mount 4GB partition (xfs file system)
- ii. Create /music directory to mount 5.5GB partition (ext4 file system)
- iii. Check whether the directories created or not.

8. Checking the partitions and mount those partitions on respective directories.

```
sunam@kali:/$ cd
sunam@kali:~$ sudo fdisk -l
Disk /dev/sdb: 10 GiB, 10737418240 bytes, 20971520 sectors
Disk model: VMware Virtual S
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0xd3ec3086

Device      Boot    Start        End    Sectors    Size Id Type
/dev/sdb1                2048    8390655    8388608     4G 83 Linux
/dev/sdb2            8390656   19924991   11534336    5.5G 83 Linux

Disk /dev/sda: 25 GiB, 26843545600 bytes, 52428800 sectors
Disk model: VMware Virtual S
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x05a89833

Device      Boot    Start        End    Sectors    Size Id Type
/dev/sda1    *          2048    44040191   44038144    21G 83 Linux
/dev/sda2          44042238   52426751    8384514     4G  5 Extended
/dev/sda5          44042240   52426751    8384512     4G 82 Linux swap / Solaris

sunam@kali:~$ sudo mount /dev/sdb1 /data
sunam@kali:~$ sudo mount /dev/sdb2 /music
sunam@kali:~$
```

- i. Mounting 4GB partition to /data directory
- ii. Mounting 5.5GB partition to /music directory

9. Verify whether the partition mounted on directories properly or not

```
sunam@kali:~$ sudo mount
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
udev on /dev type devtmpfs (rw,nosuid,nodev,noexec,relatime,size=3034740k,nr_inodes=758687,mode=755)
devpts on /dev/pts type devpts (rw,nosuid,nodev,noexec,relatime,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,nodev,noexec,relatime,size=612900k,mode=755)
/dev/sda1 on / type ext4 (rw,relatime,errors=remount-ro)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev)
tmpfs on /run/lock type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120k)
tmpfs on /sys/fs/cgroup type tmpfs (ro,nosuid,nodev,noexec,mode=755)
cgroup2 on /sys/fs/cgroup/unified type cgroup2 (rw,nosuid,nodev,noexec,relatime,nsdelegate)
cgroup on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,xattr,name=systemd)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime)
none on /sys/fs/bpf type bpf (rw,nosuid,nodev,noexec,relatime,mode=700)
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpuset)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices)
cgroup on /sys/fs/cgroup/blkio type cgroup (rw,nosuid,nodev,noexec,relatime,blkio)
cgroup on /sys/fs/cgroup/cpu,cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,cpu,cpuacct)
cgroup on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,memory)
cgroup on /sys/fs/cgroup/pids type cgroup (rw,nosuid,nodev,noexec,relatime,pids)
cgroup on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime,perf_event)
cgroup on /sys/fs/cgroup/net_cls,net_prio type cgroup (rw,nosuid,nodev,noexec,relatime,net_cls,net_prio)
cgroup on /sys/fs/cgroup/rdma type cgroup (rw,nosuid,nodev,noexec,relatime,rdma)
cgroup on /sys/fs/cgroup/freezer type cgroup (rw,nosuid,nodev,noexec,relatime,freezer)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=27,pgrp=1,timeout=0,minproto=5,maxproto=5,direct,pipe_ino=16635)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime,pagesize=2M)
mqueue on /dev/mqueue type mqueue (rw,nosuid,nodev,noexec,relatime)
debugfs on /sys/kernel/debug type debugfs (rw,nosuid,nodev,noexec,relatime)
sunrpc on /run/rpc_pipefs type rpc_pipefs (rw,relatime)
fusectl on /sys/fs/fuse/connections type fusectl (rw,nosuid,nodev,noexec,relatime)
vmware-vmblock on /run/vmblock-fuse type fuse.vmware-vmblock (rw,relatime,user_id=0,group_id=0,default_permissions,allow_other)
binfmt_misc on /proc/sys/fs/binfmt_misc type binfmt_misc (rw,nosuid,nodev,noexec,relatime)
tmpfs on /run/user/1000 type tmpfs (rw,nosuid,nodev,relatime,size=612890k,mode=700,user=1000,gid=1000)
gvfsd-fuse on /run/user/1000/gvfs type fuse.gvfsd-fuse (rw,nosuid,nodev,relatime,user_id=1000,group_id=1000)
/dev/sdb1 on /data type xfs (rw,relatime,attr2,inode64,logbufs=8,logbsize=32k,noquota)
/dev/sdb2 on /music type ext4 (rw,relatime)
sunam@kali:~$
```

- i. Execute mount command to see the result (refer highlighted section on the above figure).

10. Create file on both directories /data and /music using sequence command and verify the file size

```
sunam@kali:~$ sudo seq 110100000 > /data/file1
sunam@kali:~$ sudo seq 110100000 > /music/file1
sunam@kali:~$ du -h /data
945M    /data
sunam@kali:~$ du -h /music
945M    /music
sunam@kali:~$
```

- i. Here we have created a file on both directories having 945 MB size which is almost 1GB.
- ii. We used du -h [directory name] to check the file size on those directories.

11. Verify the disk usage consumption on both mounted partitions.

```
sunam@kali:~$ df -h
```

| Filesystem | Size | Used  | Avail | Use% | Mounted on     |
|------------|------|-------|-------|------|----------------|
| udev       | 2.9G | 0     | 2.9G  | 0%   | /dev           |
| tmpfs      | 599M | 1.2M  | 598M  | 1%   | /run           |
| /dev/sda1  | 21G  | 16G   | 3.8G  | 81%  | /              |
| tmpfs      | 3.0G | 0     | 3.0G  | 0%   | /dev/shm       |
| tmpfs      | 5.0M | 0     | 5.0M  | 0%   | /run/lock      |
| tmpfs      | 3.0G | 0     | 3.0G  | 0%   | /sys/fs/cgroup |
| tmpfs      | 599M | 12K   | 599M  | 1%   | /run/user/1000 |
| /dev/sdb1  | 4.0G | 1005M | 3.1G  | 25%  | /data          |
| /dev/sdb2  | 5.4G | 967M  | 4.2G  | 19%  | /music         |

```
sunam@kali:~$
sunam@kali:~$
```

- i. Execute df -h command
- ii. Refer highlighted portion on the figure to see the result (it shows that 4GB partition used 25% of the disk and another partition used 19% of the disk. And we also can see the free space which we can use on those partitions.

# Thank You!

